

WHAT IS CLAIMED IS:

- 1 1. A spin valve sensor comprising:
2 a first pinned layer having a first width and a first magnetic orientation;
3 a free layer having a second width disposed above the first pinned layer; and
4 a bias layer having the second width disposed above the free layer and a
5 second magnetic orientation orthogonal to the first magnetic orientation, wherein the
6 second width is smaller than the first width.

- 1 2. The spin valve sensor according to Claim 1, further comprising:
2 a second pinned layer having a third magnetic orientation anti-parallel to the
3 first magnetic orientation; and
4 a coupling layer disposed between the first and second pinned layers.

- 1 3. The spin valve sensor according to Claim 2, wherein a thickness of the
2 first pinned layer is substantially equal to a thickness of the second pinned layer.

- 1 4. The spin valve sensor according to Claim 3, further comprising an anti-
2 ferromagnetic (AFM) layer disposed adjacent to the first pinned layer.

- 1 5. The spin valve sensor according to Claim 4, wherein a thickness of the
2 AFM layer establishes exchange coupling between the AFM layer and the first
3 pinned layer.

- 1 6. The spin valve sensor according to Claim 4, wherein the first and
2 second pinned layers are self-pinned.

1 7. A magnetic storage system, comprising:
2 a magnetic recording medium;
3 a spin valve sensor disposed proximate to the recording medium, the spin
4 valve sensor, including:
5 a first pinned layer having a first width and a first magnetic orientation;
6 a free layer having a second width disposed above the first pinned
7 layer; and
8 a biasing layer having the second width disposed above the free layer
9 and a second magnetic orientation orthogonal to the first magnetic orientation,
10 wherein the second width is smaller than the first width.

1 8. The magnetic storage system according to Claim 7, further comprising:
2 a second pinned layer having a third magnetic orientation anti-parallel to the
3 first magnetic orientation; and
4 a coupling layer disposed between the first and second pinned layers.

1 9. The magnetic storage system according to Claim 8, wherein a
2 thickness of the first pinned layer is substantially equal to a thickness of the second
3 pinned layer.

1 10. The magnetic storage system according to Claim 9, further comprising
2 an anti-ferromagnetic (AFM) layer disposed adjacent to the first pinned layer.

1 11. The magnetic storage system according to Claim 10, wherein a
2 thickness of the AFM layer establishes exchange coupling between the AFM layer
3 and the first pinned layer.

1 12. The magnetic storage system according to Claim 10, wherein the first
2 and second pinned layers are self-pinned.